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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: **A. DAVID ERPELDING**	§	Attorney Docket No.: **HSJ920030041US1**
Serial No.: **10/600,638**	§	Examiner: **ALLEN J. HEINZ**
Filed: **20 JUNE 2003**	§	Confirmation No.: **7166**
For: **SYSTEM, APPARATUS, AND METHOD OF ASSEMBLING HAD DISK DRIVE INTEGRATED LEAD SUSPENSIONS TO ARM ELECTRONICS CABLES VIA ADDITIONAL DEGREES OF FREEDOM AT THE TAIL TERMINATION AND IMPEDANCE GROOMING THEREOF**	§	Art Unit: **2653**

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

This Brief is submitted in triplicate in support of the Notice of Appeal, mailed on January 12, 2006, in the above-referenced application.

CERTIFICATE OF MAILING
37 CFR 1.8(A)

I hereby certify that this correspondence is, on the date shown below, being deposited with the United States Postal Service as First Class Mail in an envelope addressed to **Mail Stop Appeal Brief – Patents**, Commissioner of Patents, P.O. Box 1450, Alexandria VA 22313-1450.

Signature of Betty J. Kirk

February 1, 2006
Date

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REAL PARTY IN INTEREST

The Real Party in Interest in the present Appeal is Hitachi Global Storage Technologies Netherlands B.V., the assignee, as evidenced by the assignment set forth at Reel 014223, Frame 0635.

RELATED APPEALS AND INTERFERENCES

No related appeals or interferences are known to Appellant, Appellant's legal representative, or assignee which will directly affect, or be directly affected by, or have a bearing on the Board's decision in the present Appeal.

STATUS OF THE CLAIMS

Claims 1–11 and 13-26 stand finally rejected by the Examiner as noted in the Final Office Action dated October 31, 2005, and are on appeal.

STATUS OF THE AMENDMENTS

No amendment was submitted subsequent to the Final Office Action.

SUMMARY OF CLAIMED SUBJECT MATTER

As shown in Figures 8-18, Appellant's invention terminates an integrated lead suspension (ILS) tail 33 to an arm electronics (A/E) cable 35. Figure 18; page 9, paragraph 33. This design provides not only a cantilever action (page 5, paragraph 10), but two additional degrees of freedom for the solder pads 65 on the ILS tail 33. Page 11, paragraph 38; page 10, paragraph 35. In addition to the cantilever action in the ILS tail 33 (page 10, paragraph 37), each individual pad 65 can move independently out of plane of the tail 33 as well as in a twisting motion about its axis. Figure 18; page 11-12, paragraph 40. The additional degrees of freedom provide additional compliance between the individual pairs of solder pads 65, 81 that form the solder joints. Figure 18; page 13, paragraph 44.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The Examiner rejected Claims 1-11 and 13-26 under 35 U.S.C. § 102(e) as being anticipated by *Itoh*. Claims 1-11 and 13-20 were rejected under 35 U.S.C. § 102(b) as being anticipated by *Erpelding*. Final Office Action, paragraphs 2 and 3.

ARGUMENT

The *Itoh* Reference

Itoh discloses a support layer 110 (Fig.1) with a bent tab 111 on which conductors 120 are formed. The conductors 120 are separated from the support layer 110 by an insulator (not numbered). Col. 3, lines 33-35; col.4, lines 15-19. Two slits 18a, 18b are formed in tab 111 through both the insulator and the support layer. As shown in Fig.4, the slits allow the two outermost conductors 120a, 120d to deflect away from tab 111 (see arrow). However, all three layers (i.e., the support layer, insulator, and conductor) move together. The conductors 120a, 120d never separate from their respective underlying support layers. Moreover, the two middle conductors 120b, 120c (Fig.3) are not separated by a slit and are unable to move independently. Thus, middle conductors 120b, 120c are always co-planar and can never separate from each other.

The *Erpelding* Reference

The *Erpelding* reference discloses a discloses a conductors 7 (Figures 4, 5B, and 6) that are all mounted to and extend between a strain relief 3 and a hook 4. Col. 5, lines 58-63. The conductors 7 "have a fixed and spaced relationship along hook 4." Col.5, lines 64-65; col.6, lines 12-13. The conductors 7 are supported by an insulating layer to avoid electrical shorts. Col. 6, line 31. This geometry absolutely prevents the conductors from moving independently. Moreover, the conductors are *intentionally* limited in their "degrees of freedom for doing the alignment." Col.8, line 20. It is impossible for these conductors to gimbal independently of each other.

Arguments for Independent Claims 1, 11, and 21

All three independent claims (Claims 1, 11, and 21) require the ILS to have a tail comprising three layers (i.e., a support layer, an insulator, and a conductor), and the support layer

to have an aperture. Each claim contains language that distinguishes both references. For example, Claim 1 requires the aperture to allow "all of the second ends of the conductors to move independently with respect to other ones of the second ends of the conductors." In contrast, *Itoh* only discloses two slits 18 among its four conductors 120. It is impossible for conductors 120b, 120c to move independently since they are formed on the same platform. *Erpelding's* conductors 7 are joined to and supported on both ends by strain relief 3 and hook 4. As a result, any movement of one of the conductors 7 will move one of the support planes 3 or 4, thereby moving one or more of the other conductors as well.

Claim 11 requires "the support layer [to] define[] a plane, and wherein the second ends of the conductors are free to move out of the plane independently with respect to the other ones of the second ends of the conductors." Neither reference can satisfy this requirement since all of their conductors are permanently mounted to the underlying support layers. Their respective conductors always move with their support layers and cannot move out of the planes defined by the support layers.

Claim 21 requires the support layer to define a plane and has "an asymmetrical opening that is contoured to a shape of all of the second ends of the conductors." *Itoh* only has two slits for four conductors, and they are not contoured to the shape of any of the conductors. *Erpelding* only has one U-shaped aperture (not numbered) and it is not contoured to any surrounding structure whatsoever. Moreover, Claim 21 requires "a plurality of apertures for accommodating independent gimbal movement of each of the second ends of the conductors, such that each of the second ends of the conductors have at least two degrees of freedom with respect to other ones of the second ends of the conductors." Thus, like Claim 1, all of the conductors move independently.

Arguments for the Dependent Claims

Claims 4, 14, and 24 state that, "the second ends of the conductors are free to twist about their respective axes independently with respect to the other ones of the second ends of the conductors." Likewise, Claims 5 and 15 state that "the second ends of the conductors are free to gimbal in at least two degrees of freedom with respect to the other ones of the second ends of the

conductors." Neither of the cited references show or describe any ability of their conductors to twist.

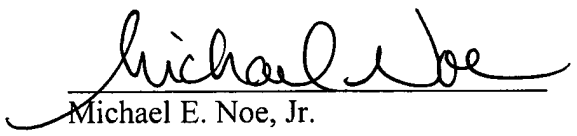
Claims 6 and 16 define the aperture as "a single rectangular opening formed in the support layer for accommodating independent movement of all of the second ends of the conductors." *Itoh* only discloses slits, not a rectangular opening. Moreover, each slit only accommodates the movement of one conductor. *Erpelding* only has the one U-shaped opening referenced above. Similarly, Claims 7 and 17 define the aperture as "a plurality of apertures, each of which accommodates independent movement of one of the second ends of the conductors."

Claims 9, 19, and 25 define the support layer as "a plurality of fingers, each of which extends into one of the plurality of apertures for providing additional support for a respective one of the second ends of the conductors, such that the fingers are impedance groomed with respect to the second ends of the conductors." Neither reference satisfies these numerous additional elements since they disclose no fingers, *Itoh's* conductors are spaced apart from its slits, and neither reference makes any mention of impedance grooming. Finally, Claims 10, 20, and 26 require the insulation layer to have "an opening and a plurality of insulation pads formed in the opening for preventing contact between the support layer and the second ends of the conductors." *Itoh's* slits are separate and spaced apart from its conductors and insulators, so they cannot be "formed in the opening." *Erpelding* does not describe any insulation being formed in an opening.

Conclusion

For all of the foregoing reasons it is respectfully urged that the claims are in condition for allowance and favorable action is requested. Please charge **Hitachi Global Storage Technologies' Deposit Account No. 50-2587** in the amount of **$500.00** for the Appeal Brief fee. If any additional fees are required, please charge **Hitachi Global Storage Technologies' Deposit Account No. 50-2587**.

Respectfully submitted,



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CLAIMS APPENDIX

1. An integrated lead suspension, comprising:

a tail having a plurality of conductors, each of the conductors having a first end extending from a head area, and a second end with an axis, such that the tail supports the second ends of the conductors, the tail further comprising:

a support layer having at least one aperture formed therein for allowing all of the second ends of the conductors to move independently with respect to other ones of the second ends of the conductors; and

an insulation layer formed between portions of the conductors and the support layer for preventing contact therebetween.

2. The integrated lead suspension of claim 1, wherein the support layer defines a plane, and wherein the second ends of the conductors are free to move out of the plane independently with respect to the other ones of the second ends of the conductors.

3. The integrated lead suspension of claim 2, wherein the second ends of the conductors bend independently with respect to the other ones of the second ends of the conductors.

4. The integrated lead suspension of claim 1, wherein each of the second ends of the conductors are free to twist about their respective axes independently with respect to the other ones of the second ends of the conductors.

5. The integrated lead suspension of claim 1, wherein each of the second ends of the conductors are free to gimbal in at least two degrees of freedom with respect to the other ones of the second ends of the conductors.

6. The integrated lead suspension of claim 1, wherein the at least one aperture is a single rectangular opening formed in the support layer for accommodating independent movement of all of the second ends of the conductors.

7. The integrated lead suspension of claim 1, wherein the at least one aperture formed in the support layer comprises a plurality of apertures, each of which accommodates independent movement of one of the second ends of the conductors.

8. The integrated lead suspension of claim 1, wherein the at least one aperture is a single asymmetrical opening that is contoured to a shape of all of the second ends of the conductors to define a plurality of apertures for accommodating independent movement of all of the second ends of the conductors.

9. The integrated lead suspension of claim 8, wherein the support layer has a plurality of fingers, each of which extends into one of the plurality of apertures for providing additional support for a respective one of the second ends of the conductors, such that the fingers are impedance groomed with respect to the second ends of the conductors.

10. The integrated lead suspension of claim 1, wherein the insulation layer has an opening and a plurality of insulation pads formed in the opening for preventing contact between the support layer and the second ends of the conductors.

11. A head gimbal assembly, comprising:

a mounting device;

an integrated lead suspension mounted to the mounting device and having a read/write head, a tail, and a plurality of conductors, each of the conductors having a first end electrically interconnected with and extending from the read/write head, and a second end with an axis, such that the tail supports the second ends of the conductors, the tail further comprising:

a support layer having at least one aperture formed therein for allowing the second ends of the conductors to move independently with respect to other ones of the second ends of the conductors;

an insulation layer formed between portions of the conductors and the support layer for preventing contact therebetween; and

the support layer defines a plane, and wherein the second ends of the conductors are free to move out of the plane independently with respect to the other ones of the second ends of the conductors.

13. The integrated lead suspension of claim 12, wherein the second ends of the conductors bend independently with respect to the other ones of the second ends of the conductors.

14. The integrated lead suspension of claim 11, wherein each of the second ends of the conductors are free to twist about their respective axes independently with respect to the other ones of the second ends of the conductors.

15. The integrated lead suspension of claim 11, wherein each of the second ends of the conductors are free to gimbal in at least two degrees of freedom with respect to the other ones of the second ends of the conductors.

16. The integrated lead suspension of claim 11, wherein the at least one aperture is a single rectangular opening formed in the support layer for accommodating independent movement of all of the second ends of the conductors.

17. The integrated lead suspension of claim 11, wherein the at least one aperture formed in the support layer comprises a plurality of apertures, each of which accommodates independent movement of one of the second ends of the conductors.

18. The integrated lead suspension of claim 11, wherein the at least one aperture is a single asymmetrical opening that is contoured to a shape of all of the second ends of the conductors to define a plurality of apertures for accommodating independent movement of all of the second ends of the conductors.

19. The integrated lead suspension of claim 18, wherein the support layer has a plurality of fingers, each of which extends into one of the plurality of apertures for providing additional

support for a respective one of the second ends of the conductors, such that the fingers are impedance groomed with respect to the second ends of the conductors.

20. The integrated lead suspension of claim 11, wherein the insulation layer has an opening and a plurality of insulation pads formed in the opening for preventing contact between the support layer and the second ends of the conductors.

21. A hard disk drive, comprising:

an enclosure;

a disk pack assembly mounted to the enclosure and having a media storage disk that is rotatable relative to the enclosure;

an actuator movably mounted to the enclosure and having a head gimbal assembly including an integrated lead suspension, a read/write head, a tail extending from the integrated lead suspension, and a plurality of conductors, each of the conductors having a first end electrically interconnected with and extending from the read/write head, and a second end with an axis, such that the tail supports the second ends of the conductors, the tail further comprising:

a support layer defining a plane and having an asymmetrical opening that is contoured to a shape of all of the second ends of the conductors to define a plurality of apertures for accommodating independent gimbal movement of each of the second ends of the conductors, such that each of the second ends of the conductors have at least two degrees of freedom with respect to other ones of the second ends of the conductors; and

an insulation layer formed between portions of the conductors and the support layer for preventing contact therebetween.

22. The hard disk drive of claim 21, wherein each of the second ends of the conductors are free to move out of the plane independently with respect to the other ones of the second ends of the conductors.

23. The hard disk drive of claim 21, wherein each of the second ends of the conductors are free to bend independently with respect to the other ones of the second ends of the conductors.

24. The hard disk drive of claim 21, wherein each of the second ends of the conductors are free to twist about their respective axes independently with respect to the other ones of the second ends of the conductors.

25. The hard disk drive of claim 21, wherein the support layer has a plurality of fingers, each of which extends into one of the plurality of apertures for providing additional support for a respective one of the second ends of the conductors, such that the fingers are impedance groomed with respect to the second ends of the conductors.

26. The hard disk drive of claim 21, wherein the insulation layer has an opening and a plurality of insulation pads formed in the opening for preventing contact between the support layer and the second ends of the conductors.

EVIDENCE APPENDIX

--NONE--

RELATED PROCEEDINGS APPENDIX

--NONE--